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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,680	08/18/2003	Brenda D. Kraus	MI22-2310	4607
21567	7590	02/09/2007		
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			EXAMINER TALBOT, BRIAN K	
			ART UNIT	PAPER NUMBER
			1762	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/09/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/643,680	<b>Applicant(s)</b> KRAUS ET AL.	
	<b>Examiner</b> Brian K. Talbot	<b>Art Unit</b> 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10-64 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-64 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/16/07</u> | 6) <input type="checkbox"/> Other: _____  |

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1. The amendment filed 1/16/07 has been considered and entered. Claim 9 has been canceled. Claims 1-8 and 10-64 remain in the application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
4. In light of the amendment filed 1/16/07, the 35 USC 102 rejection has been withdrawn. The following 35 USC 103 rejections have been necessitated by the amendment.

***Claim Rejections - 35 USC § 103***

5. Claims 5-8,11,12,14,15,17 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al. (7,098,131).

Kang et al. (7,098,131) teaches a method of forming atomic layers and thin films including tantalum nitride and devices including the same. A tantalum amine derivative reactant (which is an amido or imido metal organic compound) is introduced onto a substrate, chemisorbing a portion of the reactant on the substrate, removing non-chemisorbed reactant from the substrate and introducing a reactant gas onto the substrate to form the nitride film (abstract). TiN can be formed on the substrate by introducing a reacting gas to remove a ligand-bonded element from the chemisorbed reactant. The ligand-bonded element can be removed using a compound that comprises  $H_2$ ,  $NH_3$ ,  $SiH_4$  or  $Si_2H_6$  or a combination thereof. Activation of the reacting gas can be done with a remote plasma which may prevent damage of the substrate (col. 6, line 19 – col. 7, line 40)

With respect to claims reciting the process being free of plasma, both the chemisorbing step and the organic removing step. Kang et al. (7,098,131) teaches a remote plasma (in some cases” can be used. Hence, it is the Examiner’s position that Kang et al. (7,098,131) also teaches those instances where a plasma is not utilized (pg. 6, lines 58 and col. 8, lines 15-25).

6. Claims 18-21, 26-28 and 36-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al. (7,098,131) in combination with Choi et al. (7,067,420).

Features detailed above concerning the teachings of Kang et al. (7,098,131) are incorporated here.

Kang et al. (7,098,131) fails to teach a direct plasma process versus a remote plasma process.

Choi et al. (7,067,420) teaches forming a metal layer on a semiconductor. The metal layer can be formed by ALD. A chemisorbing layer is applied and then contacted with a ligand removing gas to remove the ligand (abstract). Choi et al. (7,067,420) teaches a remote or direct plasma can be utilized (col. 3, line 59, col. 7, lines 15 and 45 and claim 13).

Therefore it would have been obvious at the time the invention was made to have modified Kang et al. (7,098,131) ALD process by utilizing a direct plasma versus a remote plasma as evidenced by Choi et al. (7,067,420) with the expectation of achieving similar success as Choi et al. (7,067,420) teaches utilizing either a remote or direct plasma for success.

7. Claims 1-4,10,13,16,22-25 and 30-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al. (7,098,131) in combination with Kim et al. (6,576,053).

Features detailed above concerning the teachings of Kang et al. (7,098,131) are incorporated here.

Kang et al. (7,098,131) fails to teach a removing gas void of hydrogen and/or CO.

Kim et al. (6,576,053) teaches an ALD process whereby an oxidizing agent such as CO<sub>2</sub>, O<sub>3</sub>, O<sub>2</sub> and N<sub>2</sub>O are used as a second reactant to form the ALD thin film and remove ligands from the first reactant ( abstract and col. 2, lines 33-60 and col. 3, lines 29-45).

Therefore it would have been obvious at the time the invention was made to have modified Kang et al. (7,098,131) ALD process by utilizing a direct plasma versus a remote plasma as evidenced by Kim et al. (6,576,053) with the expectation of achieving similar success.

***Response to Amendment***

8. Applicant's arguments with respect to claims 1-8 and 10-64 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argued that the Kang reference is not prior art as it was filed on 3/28/04 that is after the filing (8/18/03) of the instant application.

The Examiner agrees in part. While Applicant is correct with respect to the filing dates, Applicant is directed to MPEP 201.11(III)(a) which does not preclude the reference from the utilizing the effective filing date of the continuation-in-part application 10/196,814 since the subject matter relied upon is supported by the CIP reference.

Applicant argued that the prior art fails to teach the claimed process absent a plasma.

Kang et al. (7,098,131) also teaches those instances where a plasma is not utilized (pg. 6, lines 58 and col. 8, lines 15-25).

Applicant argued that the prior art fails to teach a ligand void of hydrogen and/or is CO.

Kim et al. (6,576,053) teaches an ALD process whereby an oxidizing agent such as CO<sub>2</sub>, O<sub>3</sub>, O<sub>2</sub> and N<sub>2</sub>O are used as a second reactant to form the ALD thin film and remove ligands from the first reactant as detailed above. While the Examiner acknowledges the fact that the reference fails to recite CO, it is the Examiner's position that one skilled in the art would have had a reasonable expectation of achieving similar success with any known "oxidizing

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agent” including the claimed CO. Furthermore, CO<sub>2</sub> is disclosed and since this is close to the claimed CO, one skilled in the art would have a reasonable expectation of achieving similar success.

Applicant argued that the prior art teaches a remote plasma and the claims recite a plasma within the chamber, i.e. a direct plasma.

Choi et al. (7,067,420) teaches a remote or direct plasma can be utilized in a similar process as detailed above.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K. Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Brian K Talbot  
Primary Examiner  
Art Unit 1762

BKT